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Article (Unspecified)

Psarikidou, Katerina (2020) Em-‘powering’ niche innovations: learning from cycling inequalities. *Applied Mobilities*. ISSN 2380-0127

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EM-‘POWERING’ NICHE INNOVATIONS: LEARNING FROM CYCLING INEQUALITIES

Author: Katerina Psarikidou, Science Policy Research Unit, University of Sussex; a.psarikidou@sussex.ac.uk

Journal: Applied Mobilities

Abstract:

This paper aims to situate power in ‘niche innovations’ through an investigation of cycling inequalities in the city of Birmingham. Much research has focused on the sustainability and innovation potential of cycling. However, debates usually revolve around the power relations between cycling and the dominant automobility regime, thus ignoring the possible inequalities embedded within niches (Furness 2010; Geels 2012; Tyfield, 2014; Popan, 2019). This paper aims to contribute to such analyses by unfolding the multiple inequalities and relations of exclusion that can be embedded in the practice of cycling. Drawing on Mobilities research for the EPSRC Liveable Cities programme, it focuses on the car-dependent city of Birmingham, in order to explore cycling as a practice with various socio-material, infrastructural, political and economic entanglements that can embed, reproduce or generate new socio-spatial inequalities, processes of gentrification and immobilities (Lubitow and Miller 2010; Stehlin 2014; Aldred 2015; Lam 2018). Through such analysis, this paper aims to situate power in examining niche innovations (see also Tyfield 2014). However, it also aims to underline that understanding and addressing such inequalities are central for not only locating cycling in the centre of developing a more sustainable mobility future, but also enabling a more sustainable future for cycling itself.

Keywords:

Cycling, Inequalities, Niche Innovations, Power, Mobilities, Sustainability.

Introduction

This article aims to situate inequalities in the centre of understanding cycling as an innovative mobility practice with a transformative sustainability potential. Recent research has focused on the sustainability and innovation potential of cycling (e.g. Tyfield 2014; Geels 2012). However, in many cases, cycling is discussed as the ‘niche innovation’ that is an alternative to the dominant automobility regime (Furness 2010; Geels 2012; Popan, 2019). As a result, debates mostly revolve around the power relations between competing mobility systems, whilst ignoring the possible power relations that can be embedded within niches, such as this of cycling. This paper aims to enhance existing knowledge on ‘niche innovations’ by specifically unfolding the multiple inequalities and relations of exclusion that can be embedded in cycling systems. In doing so, it also aims to contribute to the growing scholarship that is attentive to questions of social justice related to cycling (Stehlin 2014; Aldred 2015; Hoffman 2016; Lam 2018) as well as Mobilities more broadly (Birtchnell and Caletrio, 2014; Manderscheid 2014; Sheller 2016).

The article begins by unpacking debates about inequalities within three particular areas of theoretical and research interest. It first focuses on the concept of ‘innovation’, paying particular attention to the ways power and inequalities have been portrayed, as well as the role of cycling in such debates. It then moves to the concept of Mobilities as a key theoretical lens and heuristic device for understanding inequalities within mobility systems and beyond. Thirdly, it offers an overview of the types of inequalities discussed in existing cycling research. The article then brings these three theoretical and research lenses together, through the investigation of ‘cycling inequalities’ in the car-centric UK city of Birmingham. Drawing on Mobilities research conducted within the remits of the [information disclosed for anonymity purposes], it analyses cycling as a practice that can embed, reproduce or generate new socio- spatial inequalities, processes of gentrification and immobilities.

Through these analyses, the article aims to point our attention to the

inequalities that are embedded within niches (Tyfield 2014), and help us realise that sustainability transitions are not only the outcome of overcoming power relations between different mobility systems (usually portrayed as the ‘power-ful’ dominant regime and the ‘power-less’ marginalised alternative), but also within a system – including the otherwise configured as ‘power-less’ or ‘marginalised’ alternative. It thus argues that understanding and addressing such inequalities are central for not only locating cycling in the centre of developing a more sustainable mobility future, but also creating a more sustainable future for the practice of cycling itself.

Innovation and Inequalities

Innovation has been widely depicted as pivotal for transitioning towards more sustainable futures, also in terms of mobilities. However, in many cases, a narrow techno-scientific understanding of the concept prevails that also has significant implications on the types of knowledges and actors that can be important for the production of innovation. As Suchman and Bishop put it (2000), innovations often turn into conservative, top-down projects of exclusion, primarily associated with the use of ‘new technologies’ and the participation of certain ‘innovators’ while marginalising others (see also Felt et al, 2007; Arthur 2013). Acknowledging the inherent inequalities in such innovation process, a more open ‘socio- technical’ approach becomes crucial for re-thinking innovation as a more inclusive and participatory process of ‘collective experimentation’ (Felt et al 2003), but also acknowledging the significance of those currently marginalised small-scale, bottom-up ‘niches’ for the production of innovation (Geels and Schot, 2007; Psarikidou 2015).

Such understandings are also pivotal for re-invigorating the role of ‘the social’ in innovation processes. They help reconsider that innovations primarily take place in society (Tuomi 2003:5); that they are ‘not merely about changes in technical products but also policy, user practices, infrastructures, structures and symbolic meanings’ (Geels 2006: 165), but also that they involve and are driven by relations of power (Tyfield

2014). The Multi-level Perspective (MLP) is a broader tradition of innovation studies that aims to point our attention to the more complex ‘landscape’ of social, regulatory, political, economic and technical factors, but also the more antagonistic relations between niches and regimes in the pursuit of sustainability transitions (Geels and Schot 2007; Tyfield 2014). It underlines the significance of ‘niche innovations’ in pursuing sustainability transitions, but also their limitations in achieving in radical systemic change. In this context, power is primarily configured as a relation between the dominant regimes and alternative niches, explaining the failure of the second to contribute to meaningful change

Mobilities has been one of the cases extensively used to describe sustainability transitions. However, as in most cases, power relations have been mainly depicted between the power-ful automobility regime and the power-less alternatives (Geels 2006; Manderscheid 2014). Cycling has been discussed within the context of primarily constituting an alternative to the dominant regime, that is the car system (Tyfield 2014). Thus, on the one hand, cycling represents the bottom-up alternative system that aims to challenge the inherent inequalities in the traditional top-down technology-driven innovation processes, by enabling a wider participation of stakeholders and initiatives in sustainable mobility transitions. Mirroring this power-based dynamic, attention is mainly paid to its alternative position to automobility, and the emerging relations of power and inequalities between the ‘car regime’ and the ‘bicycle niche’¹. It thus ignores the inherent inequalities that can be embedded within the bike system as a niche, and the possible implications that this can have for the future of cycling as an innovative sustainable mobility practice.

Mobilities and Inequalities

The Mobilities paradigm is inextricably linked to understanding and

¹ See also critique by Tyfield on a ‘broad-brushed’ distinction between the ‘bad’ high-carbon systems and the ‘good’ low- carbon niches, as observed in Smith’s et al 2010 paper ‘Innovation Studies and Sustainability Transitions: the allure of Multi-Level Perspective and its challenges’.

describing power and inequalities within mobility systems and beyond. It constitutes a heuristic device that helps us understand the constant and antagonistic movement of people, things, information and ideas (Urry 2007). In their *Elite Mobilities*, Birtchnell and Caletrio (2014) provide an account of the class inequalities that are embedded in the development and evolution of different transport modes – from rail to car and the more recent aeromobility. Such examples help us consider that not everybody and everything moves in the same way or at the same speed; that while some are on the move, others might not be able to move at all, or move at their own will or preferred way. Furthermore, the way some might move can be directly connected to or impact on the movement or non-movement of others (see also Bauman 2000; Urry 2007). They thus point our attention to significance of phenomena of immobilities and stillness, as well as questions of ‘motility’ (Kauffman 2002; Manderscheid 2009) and ‘speed’ (Bauman 2000; Popan 2019) for understanding inequalities through the lens of Mobilities.

Such accounts have also been important for situating ‘Mobilities Inequalities’ within the wider context of capitalist urbanism (Peck 2010; Graham and Marvin 2001). Following Harvey’s logic of a time-space compression (1990), ‘motility’ and ‘speed’ become significant forces for the re-organisation of urban space around the movement of a ‘productive’ elite who, in this way, would be able to also overcome capital’s barriers to growth. What matters is not just reduced to actual movement, but also to the potential, or else ‘the power’, that someone or something may have to move. What matters is not just reduced to how one moves, but also how fast one can move, with those moving or being able to move faster also being the most powerful. And, such movements are also significant for the reconfiguration of Mobilities as a productive force of gentrification – contributing to the commodification of urban space (Levebvre 2003) and the configuration of infrastructures as symbols of power and promise, as well as exclusion and inequalities (Kaika 2011; Harvey and Knox 2012).

Recent work has attempted to situate cycling in this wider capitalist

logic of ‘productivity’, also closely linked to ideas of ‘motility’ and ‘speed’. Aldred (2015) has pointed our attention to a general policy urge for ‘commuter’ and ‘utility’ cycling. For her, such propositions are directly linked to an intention of ‘normalising’ cycling by overcoming the ‘stigma’ associated with cycling as a leisure practice or a subculture of unruly individuals. By focusing on commuting, cycling becomes one more fast transport mode in the pursuit of ‘productivity’. This, on the one hand, helps overcome inequalities between cycling and other transport modes, in terms of both infrastructural investment and road space use in cities. However, it also points our attention to the new (infra)structures of power and relations of inequalities that can be generated around cycling but also within cycling itself – in terms of who can cycle, how, where, and why (see also Stehlin 2014).

Cycling and Inequalities

Cycling research is recently paying more attention to the inequalities embedded within cycling systems and practices. Gentrification has been a key subject of study, indicating the ways cycling and especially infrastructural developments around cycling can exacerbate or even generate new inequalities within cityscapes. For example, Lubitow and Miller (2010) have underlined the potential ‘unsustainability’ of sustainable development projects around cycling. In their work, they approached a bikeway system in Portland, Oregon, as a contested terrain in which larger concerns over racism, gentrification and historical inequities can open up, resulting not only in the physical displacement of certain ethnic socio-economic groups from their old neighbourhood, but also their social exclusion from local urban planning decision-making processes. Stehlin’s use of ‘neighbourhood use values’ (2014; see also Logan and Molotch 2007) is also intended to manifest the complex racial and class inequalities that can be inscribed to urban regeneration around cycling. Situated within the urban capitalist logic of ‘productivity’ and ‘speed’, cycling infrastructure reconfigures urban spaces as places of power and desire. Thus, by adding ‘value’ to certain neighbourhoods, cycling turns into a gentrifying mechanism that

displaces old residents – usually families – for the sake of the new urban elite – usually comprised by young professionals (Lubitow and Miller 2010; Stehlin 2014). Age has also been discussed in relation to cycling infrastructure. In her work, Aldred (2015) highlighted the discriminatory potential of ‘cycling as a utility practice’, against those older age groups that would be interested in ‘cycling as a leisure activity’. For Lam (2018), the ageing population is one of those ‘invisible’ cyclist groups adversely affected by predominantly androcentric local urban planning decisions that, she claims, remain ‘blind’ to questions of safety related to cycling infrastructure.

Women are also another ‘invisible’ group problematized within cycling research. In existing work, cycling infrastructural provisions as well as socio-cultural norms and commitments become important in understanding cycling as a gendered practice. In her research about London’s borough of Hackney, Lam (2018) talks about an overall androcentric ‘MAMIL²- centred’ bias to cycling – as also manifested in the technological and parking interventions prioritised by local councils. Here, questions of safety and time poverty associated with a wider gendered division of household labour – e.g. with regard to child and family care commitments – also become important for understanding how current cycling planning decisions become gendered (Aldred 2013, 2015; Lam 2018). Gender discriminations have also been discussed in terms of the dress code appropriate for female professionals (Steinbach et al, 2011). So, although in Jungnickel’s studies (2015, 2018; see also Aldred and Jungnickel 2014) cycling constituted an emancipatory political act, and cycle wear the tool for gender equity, within the context of widely established socio-cultural norms and aesthetics discussed in Steinbach et al’s work (2011), cycling clothing can also constitute an obstacle to an equal uptake of cycling by both men and

² MAMIL is an acronym standing for ‘Middle-Aged Men in Lycra’. It primarily refers to UK male cyclists who ride expensive racing bicycles for leisure or work purposes, wearing endurance- and performance-enhancing body-hugging cycling clothes and/or equipment.

women. Of course, intersecting gender with ethnic and class inequalities is also important for understanding the wider socio-cultural norms that shape notions of ‘appropriateness’ within certain professional and community contexts. Such observations also apply to Jungnickel’s study of the ‘cycle bloomers’ – a phenomenon primarily restricted to the nineteenth century female urban bourgeois, thus manifesting the possible class inequalities that can be embedded in cycling politics, including cycling gender politics.

Such studies are important for approaching cycling as a complex and heterogeneous practice imbued with internal contradictions and divides. However, they also have their own limitations that can constrain our understanding of inequalities within cycling. The narrow geographical focus of existing cycling studies can be pivotal in this. Most existing research on cycling inequalities focuses on cities with strong, well-established cycling networks and cultures. For example, in the UK context, most research has focused on London and Cambridge, cities that constitute an aspirational cycling model for other UK cities, also comprised by the highest income households in the country. By doing so, such studies fail to develop a more intersectional understanding of inequalities and unpack certain discourses and practices of inequalities that can be relevant to other cities with a greater diversity, not only in terms of mobility, but also in terms of their levels of deprivation, as well as class and ethnicity.

Understanding inequalities in niche innovations through the case of cycling in Birmingham

Research rationale – why Birmingham?

This paper brings these three lenses of research enquiry together for the study of cycling inequalities in the city of Birmingham. By doing so, it is intended to contribute to existing knowledge in the field of ‘innovation studies’, by shedding light in the inequalities that can be embedded within ‘alternatives’ and ‘niches’. Acknowledging the geographically-specific limitations of existing cycling studies, it focuses on the UK city

of Birmingham. We believed that, for the study of cycling inequalities, we ought to be focusing on a less traditional cycling city, with a greater socio-demographic diversity, facing some of the key challenges that other UK cities currently face (see also Psarikidou, 2017). Birmingham is a very car-centric and car-dependent city, with 40.1% of the local population using the car for their daily journeys, while cycling amounting only to 3% of all trips (Sustrans 2017; Centro 2012). It is also a very culturally diverse and gender-balanced city. 46.9% of Birmingham's population is non-white, a percentage which is higher than the average 20% in other UK cities (Birmingham City Council 2014). Its historic economic dependence on the car is an indicator for the rising levels of unemployment and deprivation across the city – especially following the decline of car manufacturing industry (Cherry, 1994). Currently, Birmingham is the 9th most deprived local authority in the UK, with 22.5% of Birmingham's Lower Super Output Areas (LSOAs) being in the 5% most deprived areas in England, 40% of the population living in the 10% most deprived areas in the country and 44.3% of the population being economically inactive (Birmingham City Council, 2013, 2014).

According to a recent survey by Sustrans (2017), cycling remains an unequal practice within Birmingham. 44% of the households own at least a bicycle; most of these households also own a car. This latter observation is important for understanding the socially exclusive character of cycling as a practice of high-income households. This figure also provides an explanation for the portrayal of cycling as a leisure practice, and thus understanding the low numbers of everyday cycling across the city. In 2017, although 44% of the households had access to a bike, only 12% of these households use the bicycle at least once a week, while 3% of residents cycle at least five days a week. Also, despite Birmingham's high socio-demographic diversity, only 7% of the cyclists are over 65s, 30% are women and 35% of the cyclists are non-white residents (Sustrans 2017). These figures are in conflict with the recent programme of supporting local planning decisions and activities around cycling. Sitting within the local council's sustainable transport agenda

called ‘Birmingham Connected’, the city has experienced its own ‘Birmingham Cycle Revolution’, resulting in the development of 170 miles of cycle routes, new cycle parking spaces, and the refurbishment of 54 kms of existing canal tow paths³. As part of the Cycle Revolution, a campaign called Big Bike Fest was specifically developed to address inequalities within cycling. Bikeability programmes were developed to train new cyclists, 4,000 new bikes were donated to residents in high deprivation areas, as well as to local organisations for working directly with their own members and customers. Such statistics made our research of cycling inequalities in Birmingham even more interesting: why does cycling remain marginal despite the orchestrated infrastructural and financial developments in support of cycling? Why is cycling marginal despite the orchestrated efforts to address inequalities within the city through cycling, but also address inequalities within cycling?

Research methods – why cycling as ‘mobility innovation’?

My research on cycling inequalities has been informed by a series of semi-structured interviews and focus groups I conducted in the city of Birmingham. Cycling was not the key focus of my research inquiry. As part of my research for the [information disclosed for anonymity purposes], I was interested in researching ‘mobility innovations’ in cities. Inspired by ‘innovation studies’ literature, I was interested in examining the various ‘innovative practices’ that could transform an urban mobility landscape in a more sustainable direction, while increasing, or at least not substantially decreasing, the levels of wellbeing afforded by movement. Also, in our research, such ‘innovative practices’ were not restricted to a set of technological fixes

³ It is worth noting, as will also be argued further below in this article, that most of these 170 miles of cycle routes are not segregated, thus raising questions of insecurity with regard to cycling for both cyclists and non-cyclists. Similarly, the canal tow paths are not fit for everyday commuting as they mainly constitute indirect leisure routes that are also shared with others on the move (e.g. pedestrians, dog-walkers, runners).

or engineering solutions for de-carbonising current mobility landscapes; we were interested in approaching innovation as a complex socio-technical process and socio- material entanglement, and thus identifying ‘mobility innovation’ within everyday living and practices. Birmingham seemed an ideal case city for researching that – both in terms of its mobility as well as its socio-demographic landscape.

In order to achieve our research objective, I initially conducted twenty-two interviews with various ‘mobility innovators’ in the city of Birmingham. By ‘mobility innovators’, I referred to a diverse spectrum of stakeholders from the public, private and third sectors involved in work or initiatives that could transform Birmingham’s mobility landscape, either directly or indirectly. Very early in my research, cycling was the default ‘innovative practice’ discussed by the research participants, although a lot of them also acknowledged the limitations of cycling within Birmingham’s existing mobility landscape. And, the more interviews I conducted, the more the idea of cycling emerged and thus further suggested itself as a ‘mobility innovation’ to study. Cycling was a niche innovative practice that could help move beyond narrow techno- centric understandings of innovation by situating it in everyday living; it could encourage us consider the innovative potential of low-tech and small-scale everyday mobility practices, and consider a more diverse spectrum of stakeholders as innovators, including residents and city- dwellers (Suchman and Bishop, 2010; Felt et al, 2007). I thus started reading social science studies of cycling. However, the more I was reading existing literature on cycling and listening to my interviewees, the more I was wondering: if cycling is good, why is it only a ‘niche’? Why is it so marginal? Why does not everybody do it? The more I was speaking to people, the more I was becoming aware of the inequalities embedded in cycling at an inter-city as well as cross-city level. For example, I started noticing that not all cities receive same levels of investment; that not all places within a city receive the same support; that not everybody in a city owns a bike, or has access to bicycle infrastructures. Interview data was transcribed, coded and analysed, with a particular interest in unpacking the potential

inequalities embedded in cycling. Initial findings suggested the need to undertake a second research stage that would help further unpack such inequalities, by specifically attending to the voices and experiences of the local residents. I was interested in approaching everyday city-dwellers as ‘innovators’ and ‘experts’ with a transformative potential for the city. Being interested in going beyond top-down understandings of innovation, I believed that such a research stage was important for methodologically enabling more participatory and inclusive processes of knowledge production that could inform future mobility transformation and change (Felt et al, 2007; Suchman and Bishop 2010). As part of these focus groups I was interested in understanding inequalities within Birmingham’s mobility landscape; as well as understanding cycling inequalities as part of this wider landscape of mobility inequalities, by specifically attending to local residents’ approaches and experiences of cycling as part of the wider mobility landscape – e.g. whether they cycle, why and why not. We identified deprivation as an interesting indicator for investigating different experiences of mobility across the city. We were also particularly interested in understanding how experiences of mobility change as levels of deprivation change within the city.

We thus conducted a series of focus groups with residents of two different wards of Birmingham with contrasting levels of deprivation. Social inequalities were already prevalent at these very early methodological stages of selection and recruitment. It was interesting to observe processes of racialisation between these two different wards – with the high deprivation ward focus groups comprised only by residents of ethnic and Afro-Caribbean backgrounds, while the two low deprivation focus groups attended by white British only. A racialized divide also emerged within the two focus groups conducted in the high deprivation area: one being attended by residents of British Asian background, while the other by British Afro-Caribbean only. Gender-based discriminations also prevailed in our sample – with the British Asian focus group attended by males only. Finally, differences in age groups were also evident. While half of the attendees in low deprivation areas were professionals and pensioners between 40 and 70 years of age,

it was young people only – including students, unemployed and single mums – attending the other two focus groups.

A class divide between the low- and high-deprivation focus groups was also evident in terms of cycling cultures: with residents of the low-deprivation ward expressing an aspiration for cycling more, while residents of the high-deprivation wards not being interested in it, and sometimes even being sarcastic about the possibility of cycling being their preferred mode of transport. For example, high-deprivation focus group participants joked about the possibility of arriving at a wedding on a bicycle, or laughed at the possible ‘sweaty’ or ‘exhausted’ image of their friend at home after cycling there (Male 1, Focus group 1, High Deprivation Ward, 2015; Female 1, Focus Group 2, High Deprivation Ward, 2015). Such contrasting views between the low- and high-deprivation groups are not unrelated to the contrasting class connotations of cycling for these two groups. Participants from the low-deprivation ward described cycling as an object of ‘social distinction’ (Bourdieu 1984; Sayer 2003), linked to their middle-class ethic of environmental consciousness (Male 1, Focus Group 2, Low Deprivation Ward, 2015). In this context, cycling was also primarily portrayed as a leisure mobility practice for the urban elite, mainly taking place outside the city (Male 1, Focus Group 1, Low Deprivation Ward, 2015). On the contrary, for the high-deprivation groups, cycling was still considered a symbol of deprivation, bringing back ideas of the bicycle as a poor man’s transport. This is not unrelated to the pertaining symbolic meaning of the car as an object of ‘social distinction’, also reproduced by specific regulatory frameworks that make car insurance fees and car use prohibitive in urban deprived wards, thus transforming the car into an object of aspiration, for the population living in those areas (Male 2, Focus Group 2, High Deprivation Ward, 2015). For example, young research participants expressed their aspiration of owning a car if entering the university (Male 2, Focus Group 1, High Deprivation Ward, 2015). In this particular case, the car was not just seen as a symbol of social status, but also a reward for a potential success that could also herald a shift in their social status.

Research findings – Cycling Inequalities in Birmingham

Most ‘mobility innovators’ underlined the transformative potential of cycling in the pursuit of a more sustainable mobility landscape for Birmingham. Most of them acknowledged the recent developments supporting of cycling, however, they also underlined the possible limitations to their potential, mainly due to the situatedness of cycling in the wider landscape of power and inequalities taking place at an institutional, city and intercity level (Geels 2005; Geels and Schot 2007). This section aims to map such inequalities as experienced and described by our research participants. Despite the interconnecting and intersecting character of such inequalities, for the purposes of this paper, I have clustered them in five different overarching themes, namely funding, infrastructural, policy, gender and digital inequalities, all of which prevailed as pivotal in determining as well as understanding the unequal character of cycling in the city of Birmingham.

Funding Inequalities

Unequal distribution of funding was one of the key concerns for our research participants. Particular attention has been paid to funding inequalities at an intercity level. Many interviewees compared Birmingham with London. They talked about the unequal allocation of funding between different cities, a parameter which was also significantly determined by different local governments’ political power for independent decision-making, as well as the presence of powerful influential local leaders. As two ‘mobility innovators’ representing public and third sector bodies explained:

‘There has been some support for it here and there but over the years we are dependent on councillors aren’t we? We are dependent on the political system that dictates what our priorities are’

(Local council representative 1, Interview, 2015)

‘Some UK cities have elected Mayors who have more decision making powers and that can act as a focus of course for changing the political dynamic; it can act as a focus for ideas and also a faster decision-making process. Boris Johnson is the obvious example in London but there is also an elected Mayor in Bristol, one in Leicester and several other places. So, that can affect the transport decision-making process’.

(Representative of National Cycling Advocacy Group 1,
Interview, 2015).

Funding inequalities were also identified at a cross-city level. Interviewees from the third sector underlined the power relations between large and small scale cycling organisations and the precarious position of the latter with regard to allocation of resources. By raising their concerns over cross-institutional inequalities, they suggested not only the exclusion of the less powerful cycling actors from the cycling agenda, but also the exclusion of ‘social inclusion’ as a key objective in the cycling agenda. Interviewees referred to gender and ethnic inequalities that can be perpetuated through the diminishing funding provision and resource allocation towards those social enterprises programmes that support more inclusive cycling practices. As discussed by the representative of a local cycling enterprise:

‘For a year we’ve had a ‘Be Active by Bike’ programme...In its first year we trained 350 women from ethnic minority backgrounds to ride safely and confidentially within their environment. This year because there is no funding, we have trained no additional people to become safe confident cyclists in that way... City Council and

Government need to incentivise social enterprises and organisations to say if you train as many people we will reward you with this financial package. At the moment we don’t get that at all; we get told we really like what you do; it would be great if you could get more Asian women cycling; p.s. there’s no money’.

(Representative of local social enterprise, Interview, 2015)

Infrastructural Inequalities

Inequalities have also been prevalent at an infrastructural level, especially at a cross-city level. Interviewees commented on the uneven infrastructural development, not only favouring affluent city districts, but also specific districts that were already benefiting from cycling infrastructural development. For them, such practices of infrastructural discrimination were also perpetuating class inequalities and discriminations across the city – as also manifested in unequal opportunities for, as well as access to, employment. As one of our interviewees commented:

‘If you look at Birmingham as a classic example, the number 11 bus goes round the outer ring road. Now if you get on a bus within the ring road at 7 in the morning and you are travelling to the city, you travel with people who are on low income; so they are service industry employees; they are people who clean offices; who are chamber maids in hotels; who work in a travel industry.

Now those people are paid minimum wage; some of those people will spend a fifth of their income travelling to and from work. Now all of those people live within a cyclable distance so our argument would be they ought to be the priority; we need to forget about affluent suburbs and focus deliberately on that point; not only of highest need but of high social impact’.

(Director of local cycling social enterprise 1, Interview, 2015)

Such observations were also evident in our focus group discussion. Participants in both low- and high-deprivation wards underlined the centrality of lacking infrastructure in limiting their bicycle use.

However, a distinction was clear in terms of the purpose of bicycle use amongst these two groups. For the low-deprivation group, lacking infrastructural development was primarily concerned with connectivity to outdoor off-city leisure practices, although, for the high-deprivation group, in the very limited cases cycling was mentioned as a possible alternative, it was linked to the ideas of cycling as an affordable mode for accessing, as well as enabling more opportunities for, work and education. In this context, lacking infrastructural development was understood as pivotal for not only facilitating better cross-city connectivity, but also for making bicycling more inclusive – for example through the development of subsidised free-to-use bike-sharing schemes. As a focus group participant said:

‘I am already a cyclist. Bikes are cheaper. You don’t have insurance, tax, MOT⁴; everything about the bike is cheaper than about a car. So it makes more sense; it is money efficient...’.

(Male 3, Focus Group 1, High Deprivation, 2015)

‘If we could have bikes in the same access point, so if you go to an occasion or attend some kind of workshop in the city centre, you know there is a bike there that you can use to move at least around the city centre for free...even better if I could also get back home.’

(Male 4, Focus Group 1, High Deprivation, 2015)

Policy Inequalities

Inequalities can also be observed in relation to the different policies and programmes primarily developed in support of cycling across the city. Bikeability was another area in which cross-district discriminations were prevalent. As with infrastructural investment, interviewees observed that Bikeability programmes were supported in affluent

⁴ MOT is the annual test of vehicle safety that all combustion-engine vehicles over three years old need to undertake in the United Kingdom (see also <https://www.gov.uk/check-mot-status>).

districts, thus excluding other parts of the population that would allegedly benefit from enhancement of their cycling confidence and skills. As interviewees commented, such developments were also pivotal for the perpetuation of class inequalities through cycling but also the portrayal of cycling as middle-class practice of exclusion:

‘we currently deliver Bikeability programmes in suburbs and schools where all of the evidence is that, if Bikeability wasn’t delivered, those children will still learn to ride a bike because they have a social structure which places high value on that kind of activity. So, put bluntly, they have parents who will teach them to ride a bike...

If you start to train a generation of people who live between the inner ring road and the outer ring road to travel safely and confidently by bike so when those people became chamber maids, cleaners, bus drivers then they can travel to those sources of employment by bike. You teach some in the suburb to ride a bike and he goes off and becomes a solicitor, well, who cares’.

(Director of local cycling enterprise 1, Interview, 2015)

Practices of exclusion have also been discussed in relation to existing ‘cycle to work schemes’. ‘Cycle to work’ is a tax exempt payment scheme tailored to encourage UK employees ‘commuter cycling’ by supporting their purchase or loaning of cycling equipment. Similarly to Bikeability, such schemes appeared to favour higher-income employees, thus discriminating against those working households that might have benefited financially more cycling for commuting purposes. For some of our focus group participants, limiting such subsidies to working populations was also excluding other citizen groups, including those on social support. For many, such discriminations were not only pivotal for reproducing existing stereotypes of cycling as an elite practice, but also perpetuating existing elite cycling practices through the ways in which cycling was mainly portrayed as a leisure practice:

‘I don’t have a job but would still like to cycle. Like the free bus passes

for families on benefits, we could also have free passes to bicycles'

(Female 1, Focus Group 2, High Deprivation Ward, 2015)

'I am a little bit sceptical about some of the aspects of the scheme... it works on a tax basis so the more you earn the more you save... the more tax you pay at source the bigger amount you can claim back off that bike.

...if you look at the Cycle to Work scheme, the number of people who bought bikes on the Cycle to Work scheme who never cycled to work is absolutely astronomical. Most bikes that are bought on the Bike to Work scheme sit in people's garages and are used on canal paths at weekends with their family. It has nothing to do with work.

(Local council representative 3, Interview, 2015)

The proliferation of specialised bike shops has also been discussed in this context. The complex sets of materialities around cycling were thus becoming important symbols of social distinction, that, by turning cycling into part of a commodity culture of consumerism (see Bourdieu, 1984; Sayer, 2003), not only were they excluding certain cyclists and non-cyclists who could not afford expensive cycling equipment. They were also pivotal at re-invigorating existing stereotypes of cycling as an elite practice, thus further marginalising certain socio- economic groups. As commented by a focus group participant:

'...I don't like bike shops...they are quite intimidating places staffed by people who know too much about bikes and are too enthusiastic about bikes... I can't afford one of these bikes anyway; sometimes, they cost more than a car; why do they cost this much?'

(Male 2, Focus Group 2, High Deprivation Ward, 2015)

Gender Inequalities

Gender inequalities have also been key for the stigmatisation of cycling as practice of exclusion. In this context, the material culture of cycling – e.g. special cycling clothing and other equipment – was considered a great contributor to the exclusion of women from cycling. Thus, as opposed to the role of cycling clothing for the social inclusion and emancipation of women in Jungnickel's study of the 19th century 'cycle bloomers' (2015; 2018), in the more recent context of women cyclists in early 21st century Birmingham, cycling materialities, and a prevailing prioritisation of men, and in many cases of lycra clad men, as their group of interest, seem to have been reproducing gender inequalities within the cycling context and beyond. Speed, as a signifier of cycling as part of modern capitalist culture of competition (see Aldred 2015; Popan 2019), was also discussed as a generator of gender distinctions and divides between male and female cyclists, with women mainly choosing to separate themselves from men. As commented by a female cycling champion of a national charity operating in Birmingham and Solihull districts:

'Some ladies prefer not to have the men around for whatever reason. They also do routes for all abilities; they do maybe 5 miles up to about 35 miles at different speeds for different abilities...I haven't got a problem riding with men although I suppose to be fair sometimes if there is a mixed group and they are all roughly the same age, the men always can go quicker and want to go quicker and sometimes the ladies either can't or don't want to go quicker, sometimes they carry on cycling, sometimes they choose to go in their own groups'.

(Female champion for national cycling charity, Interview, 2015)

However, on other occasions, wider socio-cultural stereotypes were also pivotal for understanding the marginalisation of women from cycling practices. In this context, cycling gender inequalities not only constitute

part of the wider context of gender inequalities, but also the wider intersecting context with ethnic inequalities. This is also evident from the following quote, in which the uptake of cycling by certain female ethnic groups was portrayed as part of a complex set of relations of power and dependency, in which women and their engagement in cycling are described as subordinate to their husbands' will: *'An area that I am trying to increase massively is a programme called Women on Wheels...So the bulk of the women that she is training are from Muslim and Asian communities that aren't famous for cycling... The husbands now want to cycle because these are groups of people that cycling isn't in their culture. So we need to break that chain; we are breaking that taboo '.*

(Local council representative 2, Interview, 2015)

Work was another interesting context for understanding the role of certain cultural stereotypes in perpetuating gender inequalities within cycling. Female research participants explained that the prevalence of a certain image for female professionals might be in conflict with the image of a female cyclist. Thus, in contrast to Jungnickel's approach of cycling clothing as a symbol of social distinction and difference (2015), in our participants' discussion, these very same materialities can constitute a symbol of social discrimination within working environments. Here, time, also possibly due to the role of women as both productive and reproductive labour, becomes an important factor in differentiating the possibilities opened up around cycling as a commuting practice for men and women – for example due to women's combined work and schooling responsibilities (see also Psarikidou, 2018). As said:

'I get [name of son] to school. I arrive with my hair all a mess, and have a shower, and get ready at work and store my bits in a locker as well... I don't always have the time to get ready for the next meeting, and look as I am expected to look'

(Female 1, Focus group 2, Low Deprivation Ward, 2015)

The development of faster cycling routes has been discussed as a key method for overcoming time constraints discriminating against female cyclist commuters. Research participants explained the potential of faster cycling routes as the solution but they also raised concerns about them usually being darker and quieter routes, thus engendering questions of safety, especially for female cyclists (see also Psarikidou, 2018). Focus group participants also mentioned that such safety concerns can also be key to discouraging non-cyclist female groups from cycling. Thus, despite addressing the expectation of commuter cycling as faster cycling, by isolating cycling from busy roads, they were increasing concerns over safety, especially for women:

‘So the canal tow path is quite extensive and that’s one place where they could shift big cycle users, especially as a fast route. But, if you are limited to quiet routes, particularly canal paths, then fears for personal security becomes an issue. There is still a lot of people who would not use canal tow paths in the winter and in the dark and a lot of people wouldn’t use them in the day time even’

(National cycling charity representative 2, Interview, 2015)

‘I wouldn’t recommend anyone to cycle in the night there [high deprivation area]. Especially if you are a girl. The same for boys as well It could be dangerous.’.

(Female 2, Focus Group 2, High Deprivation, 2015)

Digital Inequalities

The emerging ‘digital turn’ in the practice of cycling was also picked by

research participants as an interesting aspect that could help address but also embed inequalities within cycling. Research participants made an explicit reference to route planning, which although representing a mechanism for saving working time through the facilitation of faster cycling, could also reproduce new discriminations. Specific reference was made to families and professionals with families that seem to lack the time for mapping such faster routes, as opposed to those, usually younger-aged, non-family professionals:

‘The number of times you sit with somebody who is a cycling expert in the City and they talk about planning routes. Well, who the hell has time to do that; you have three kids running around the house and you’ve got to get them off to school and you need to get to work; there’s a pile of ironing; you haven’t worked out what you are going to have for tea. Do you really think you are going to start laying a map out on the kitchen table and planning the best route? That’s for young people. It’s not surprising that people jump in a car and come into town’.

(Local council representative 4 and national cycling charity champion,
Interview, 2015)

In this context, digital technologies were suggested as pivotal for facilitating the identification of faster and safer routes, and thus diminishing the discrimination both of women cyclists as well as of families and professionals with families. However, concerns were raised here with regard to the emergence of potential digital divides and exclusions that need to be overcome for cycling to constitute a mobility practice for all:

“...So, I think the role the digital will play in the cycling revolution is about mapping and knowledge and just making stuff really easy for people; Twitter feeds give you a constant update; Apps that can teach you new ways of getting to places that you need to go to that are really simple that you might not have time to route plan on... Technology has

got a huge role to play in making those things much simpler. Of course, we need to make sure that everyone knows about and has access to them”.

(Local council representative 5, Interview, 2015)

Summary

The above analysis provides evidence of the multiple and intersecting inequalities and relations of exclusion that can be embedded in the practice of cycling. By doing so, it also encourages us to understand cycling as a ‘niche innovation’ that can go beyond the inherent inequalities within dominant innovation systems, but can also embed various inequalities that may provide an obstacle to realising their transformative sustainability potential. Thus, on the one hand, cycling was pivotal for re-iterating more inclusive understandings of innovation: not only with regard to the type of initiatives that can carry an innovation potential, but also with regard to the type of stakeholders that can be considered as ‘innovators’ (see Suchman and Bishop 2000; Felt et al, 2007). However, it was also pivotal for problematizing the potential of ‘cycling as a niche innovation’, realising the limitations within such bottom-up niches, and thus delving deeper into what has become the key focus of my research and a key challenge to overcome: cycling inequalities.

Our research in Birmingham shed light on the multiple inequalities and power relations attached to existing cycling practices. It has underlined the significance of *funding inequalities* taking place at an intercity, cross-city as well as cross-institutional level, and the reproduction of complex gender and ethnic inequalities around it – especially due to the marginalisation of ‘social inclusion’ as an objective of existing cycling strategies. It has pointed our attention to *infrastructural inequalities*. It discussed processes of ‘splintering urbanism’ (Graham and Marvin, 2001) related to cross-city uneven cycling infrastructural development,

and unpacked its possible impact on class inequalities and social immobilities – also due to the exclusion of certain socio-economic groups from ‘cycling as a commuting practice’ linked to employment and education opportunities. It has indicated the complex socio-spatial divides around existing *cycling policies* – such as the ‘cycle to work’ and ‘bikeability’ programmes, resulting in the stigmatisation of cycling as a socio-culturally ingrained elite practice of exclusion, but also in the reproduction of certain gender and class stereotypes attached to non-cyclist groups. It has underlined existing long-standing ‘class connotations’ of existing cycling materialities, and their impact on the stigmatisation and marginalisation of both cyclists and non-cyclists. It identified complex *gender inequalities* situated within the context of wider socio-cultural norms and stereotypes revolving around women’s configuration as both productive and reproductive form of labour. By doing so, it has also emphasized the intersecting nature of such inequalities – e.g. by pointing our attention to processes of racialisation embedded in the configuration of cycling as a gendered as well as an elite practice. Within this context, it also raised the possible troubling character of *digital* technologies in addressing inequalities within cycling. By doing so, it has also helped us contextualise, and thus further problematize inequalities by situating them in a wider landscape of injustices and inequalities that also need to be overcome in order to unlock those niches’ innovation potential.

Conclusions

This paper contributes to existing studies of ‘niche innovations’ by specifically focusing on the inequalities and power relations that can be embedded within niches. By doing so, it contributes to a growing body of ‘innovation studies’ literature that investigates power and inequalities within innovation systems (see Suchman and Bishop 2000; Geels and Schot 2007; Tyfield 2014). However, it also diverts from this main body of work by paying more attention to the inequalities that can be embedded within niches. It thus shifts our attention from the study of

inequalities between ‘power-ful’ dominant regime and ‘power-less’ small-scale alternatives to the study of inequalities within the usually configured ‘powerless’ niches (see also Tyfield 2014). It thus points our attention to the equally significant role of such inequalities in understanding, and thus possibly overcoming, the current limitations of various niches to realise their full innovation potential and thus contribute to a radical systemic change for sustainability.

In order to do so, the paper has specifically focused on the case of cycling as a niche innovation, with a particular interest in unpacking the usually ignored inequalities that can be embedded within niches. By focusing on cycling, on the one hand, it reiterates the significance of niches in challenging existing possible hierarchies and inherent inequalities within dominant innovation systems. Cycling is the innovative mobility practice that could help us consider the innovation potential of a wider spectrum of everyday low-tech practices, initiatives and stakeholders (see Felt et al, 2007; Suchman and Bishop 2000). On the other hand, cycling is also pivotal for realising the complex and intersecting inequalities, processes of gentrification and immobilities that can be embedded within niches. In our research, cycling inequalities appeared to take place at different levels, spaces and scales, involving and affecting a diversity of socio-economic groups and actors. In many ways, cycling appeared to be situated within a dominant logic of capitalist urbanism (Peck 2010; Graham and Marvin 2001) – as also manifested in the idealisation of motility and speed as categories for social distinction – but also within the dominant logic of a commodity consumer culture – as manifested in the complex connotations and intersecting stereotypes reproduced around diverse cycling infrastructures and other materialities (Kaika 2011; Harvey and Knox 2012). It appeared as a socio-culturally ingrained elite practice that was not only constructed but also capable of generating inequalities around it – for example with regard to class, gender and ethnicity – and (re)producing processes of stigmatisation for both cyclists and non-cyclists (see also Birtchnell and Caletrio 2014; Aldred 2015). It was thus pivotal for understanding the intersecting character of those ‘cycling

inequalities', but also realising their situatedness in a wider landscape of relations of power and inequalities.

Understanding inequalities within niches, and in this particular case within cycling, is important for situating cycling in the centre of developing not only a more sustainable mobility future, but also a more sustainable future for the practice of cycling itself. It is pivotal for understanding the limitations of current cycling practices, and thus empowering cycling in order to realise its full sustainability and innovation potential in the future. Based on our research experience, it is crucial to develop more inclusive understandings of cycling itself: a. by paying more attention to the study of cycling within less traditional cycling and more socio- demographically diverse cities, such as Birmingham; and b. by engaging and learning from a wider spectrum of stakeholders, both cyclists and non-cyclists. In order to empower cycling now and in the future, it is important to make cycling more socially inclusive. It is pivotal to challenge current cycling infrastructures of power by reallocating resources and infrastructural developments in less affluent areas, and commodify cycling in order to move beyond its dominant portrayal as an elite practice of social distinction. However, in order to achieve that, it is also essential to move beyond existing dominant, and usually intersecting, stereotypes that shape cycling as an unequal practice of exclusion. Cycling inequalities are currently situated within the wider landscape of inequalities and injustices that shape cycling as a practice of exclusion. Thus, understanding and addressing these inequalities is pivotal for understanding and addressing inequalities within existing cycling systems. And, if such a future is possible remains to be seen.

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